North/West Passage
*Clarus* Regional Demonstration

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**Project Goal**

Capitalize on opportunities to better incorporate ESS data collaboratively across state borders for more effective execution of road weather management strategies

**Concept of Operations**

Tailored plan for demonstrating how Clarus-enabled surface weather information can enhance:

– Information products and services

– New decision support tools and mechanisms

This goal was taken from the proposal response to the FHWA RFA. It was constructed to embody the goals of the North/West Passage as set forth on the North/West Passage web page.

This description of the North/West Passage Multi-State Clarus Demonstration was taken from the proposal response to the FHWA RFA. It was constructed to embody the goals of the FHWA Clarus Initiative.
This information was taken from the proposal response to the FHWA RFA. The objectives reflect both the desires of the North/West Passage and the requirements of the Clarus Initiative.
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Objectives of North/West Passage Clarus ConOps

- Understand stakeholder needs through open discussions
- Recognize operational characteristics needed to support users
- Identify personnel and skills needed to use, operate, and maintain Clarus-related solutions

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The leadership for this project is provided by the South Dakota DOT and Mr. Dave Huft. Direction is provided by a Steering Committee (Project Team) comprising representatives from each of the eight North/West Passage states. The lead contractor for the project is Meridian Environmental Technology who is responsible for drafting the Concept of Operations. The University of North Dakota Surface Transportation Weather Research Center is responsible for helping develop ESS metadata supplied to Clarus.
Stakeholder Groups

• User-driven goal require demanding stakeholder involvement
  
  – *Clarus will only be successful if the needs of the stakeholders are met!*

• Clarus North/Passage Stakeholders
  – State Transportation Decision-Makers
  – Weather Service Providers
  – Travelers
  – Non-Transportation State Decision Makers
  – Non-Surface Transportation Weather Interests
  – Research Community

The original Clarus ConOps identified stakeholders in a priority order from 1st order through 4th order. This distinction expressed these orders as:

1st order -
State DOT decision-makers

These are the individuals who will directly interact with the *Clarus* data and who put considerable emphasis on the pavement specific component of the data at the level they are observed to make immediate decisions. These are also the individuals who are the principle consumers of information provided by surface transportation weather service providers. Personnel include primarily those within maintenance and traffic operations such as transportation or transit system operators and sub entities such as maintenance operations.

Surface Transportation Weather Service Providers –

These are the private and public weather service providers who assimilate the *Clarus* data with other available data to generate products and services used by the surface transportation decision-makers.
2nd order - Weather Service Providers
These include the weather support services that are primarily interested in the meteorological component of the *Clarus* data. The group includes the NWS and its efforts in public forecasting, other private sector weather services and their value added support for broader markets such as agriculture, power utilities, and construction.

3rd order - Research Community
This category incorporates federal, academic and private sector researchers who are working to improve the state of knowledge and practice through research of surface transportation weather.

4th order - Non-surface transportation weather interests
This is a ‘catch all’ group in the sense that it includes operations and non-operations interests who choose to include the *Clarus* data in their endeavors.

After a review of the interests within the North/West Passage (see the following slides for the process), this ranking has been slightly modified to include two additional stakeholder groups – Travelers and Non-Transportation State Decision Makers. The former group consists of both the general traveling public and commercial vehicle operators. All of the North/West Passage states have existing programs such as 511 to provide support for this stakeholder group and are committed to sustaining/improving this support. In addition, all of the North/West Passage states either work or closely collaborate with public safety and emergency management agencies in their states. While both of these stakeholder groups could fall within the 4th order above, it is felt that these groups are significant to the activities of the North/West Passage states and deserve a higher degree of attention. Both should be considered as 1st order in significance.
Determining User Needs

- Review of North/West Passage state and regional ITS architectures
  - Provided an overview of existing visions
- Assessment of state ITS deployment statistics

The collection of User Needs started with developing an understanding of the plans and activities of the states within the North/West Passage Transportation Pooled Fund Study. These activities were found initially by a review of individual state/regional ITS architectures. These documents provide the blueprints for current and future activities in ITS and assists in identifying the ‘players’ of interest in each state, including non-state entities in most cases.

To learn what has been done in each state, a review of state ITS deployment statistics was make. These provide valuable information on various areas of interest to the Clarus ConOps including not only surface transportation weather but traveler information, traffic management, public safety, and other ITS interest areas.
Determining User Needs

- State stakeholder interviews / workshops
  - Each North/West Passage member state and their invited participants *(completed)*
- Stakeholder group surveys
  - Web-based survey instruments customized to target each stakeholder group *(underway)*
  - Telephone interviews of selected organizations and individuals *(underway)*

Building upon the information learned in the review of ITS architectures and ITS deployments in the North/West Passage states, a stakeholder interview instrument was developed this summer. This instrument was used in meetings held with all eight North/West Passage states. Each state was responsible for inviting stakeholders they believed to be representative of needs within the state. These stakeholders were largely state DOT representatives from IT and maintenance. However, stakeholders from state agencies of public safety, emergency management, traffic management were often present as were representatives from academia, the National Weather Service, trucking associations, and agriculture.

Results of the state stakeholder interviews were used to construct a series of stakeholder group surveys addressing the stakeholder groups presented in Slide 5. Owing to the geographic size of the North/West Passage area and in order to expedite the collection of stakeholder information, these survey instruments were developed as web-based. The web-based surveys will be conducted from late September through October. As the information from the web-based surveys is available immediately upon submission, responses will be processed as received to define user needs.

Along with the web surveys, specific organizations are being asked to participate in telephone interviews. These telephone interviews will be used to validate findings of the user needs assessment and to establish a set of specific stakeholders to participate in validation activities of the ConOps when it becomes available.
Preliminary User Needs Findings

• Need for consistent and timely information of advisory and control actions in adjacent states
• Need for more frequent and more accurate/spatially-specific road condition information and forecasts
• Need for improved resources for pre-travel planning & en route information providing for total trip/route support including:
  – Road condition / road status
  – Weather & road weather observations & forecasts

The state stakeholder interviews and workshops held through early September 2007 have already identified several generally agreed upon needs. States agree that knowing more about the advisory and control road weather management strategies occurring in adjacent states is very desirable. Situations were cited where closing a road in a neighboring state results in significant impacts on the transportation actions in their state—for example, long lines of vehicles waiting for roads to reopen or travelers needing lodging.

Complementing the need for advisory and control actions in adjacent states is the need for more reliable and location-specific road condition information. This is a challenge for the present ESS to detect, and actual road conditions are more often observed during route patrols. Having better information is not just limited to the observed conditions, but also to forecast conditions, which are crucial in planning activities for both DOTs and travelers.

Travelers planning to traverse distances beyond one state or even an entire Interstate corridor need to have reliable information over a time period dependent upon the duration of the travel and even the type of travel. For commercial vehicle traffic, dispatch decisions at one end of a corridor must take into consideration what will be transpiring as the vehicle approaches its destination. This calls for greater synthesis of weather forecast information with anticipated road conditions.
ESS-Specific Findings

- More frequent ESS data collection needed for more timely updates to road/weather conditions
- Outside of the DOTs user are less aware of where ESS resources are located and there purpose
- Need better use/understanding of road weather management strategies using ESS data within transportation agencies

While the Clarus Initiative is focused on road weather products and services that can be realized from the consolidation of ESS data, the state DOT interviews have provided feedback on ESS technology itself. The findings listed on this slide are generally consistent across the North/West Passage states.

Most state DOTs are aware of ESS data in their state and many of the states visited are aware of where to find ESS data in adjacent states. However, the access of data across state borders is not routinely done by the states. State DOTs believe that ESS are expected to provide better road weather forecasts that enable them to better position resources and people to respond to storms.
Candidate
Use Case Scenarios

• Full North/West Passage I-94 / I-90 corridor-wide 511 access
• Regional road condition depiction
  – Interstate maintenance decision support
  – Support for traveler decision making
  – Includes closure-related information
• North/West Passage-wide travel planning web resources
• Integrated regional depiction of all observed weather conditions including road weather

Preliminary results suggest several likely Use Case Scenarios.

The availability of corridor complete 511 and web-based travel planning resources would permit both the public and commercial traveler with valuable information to make decisions on on-going and pre-travel actions. The volume of travel on I-90 and I-94 that spans more than one state is significant. Because of the rural nature of these corridors and the vast stretches where services are limited, travel is a major concern during periods of inclement weather conditions. Knowing the present and future weather and anticipated road conditions resulting from weather is an important element in decisions. The interest from trucking associations and CVO is particularly high for this capability.

The depiction of regional road and weather conditions for adjacent states is of interest also to state DOTs, particularly the winter maintenance community. The coordination of advisory and control actions across state borders has been cited as important for in-state planning and actions.
The collection of stakeholder information is underway. As collection progresses data will be synthesized into an assessment of user needs and a report summarizing User Needs.

As User Needs are finalized, a set of Use Case Scenario candidates will be proposed to the North/West Passage Project Team. The selected Use Case Scenarios will be developed following guidelines set forth by the FHWA and will include sufficient details to provide insight into the construction of a draft Concept of Operations. This ConOps will be developed, again, according to the guidelines set forth by the FHWA.
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